

CLAIMS

What is claimed is:

1. A method of decoding implemented by a video decoder, comprising:
receiving, by the video decoder, a video bitstream including a plurality of layers, a video parameter set (VPS) specifying a plurality of output layer sets (OLSs) each including one or more layers from the plurality of layers, and a sequence parameter set (SPS) including a set of decoded picture buffer (DPB) parameters for each of the one or more layers only once when one or more of the one or more layers have been included in more than one of the plurality of OLSs;
and
decoding, by the video decoder, a picture from one of the plurality of layers to obtain a decoded picture.
2. The method of claim 1, further comprising selecting an output layer from one of the one or more layers prior to the decoding.
3. The method of any of claims 1 to 2, further comprising selecting the picture from the output layer after the output layer has been selected.
4. The method of any of claims 1 to 3, wherein the set of DPB parameters includes a first DPB size and a second DPB size.
5. The method of any of claim 4, wherein the first DPB size corresponds to an output layer from the one or more layers and the second DPB size corresponds to a non-output layer from the one or more layers.
6. The method of any of claims 1 to 5, wherein the SPS includes level information for each of the one or more layers only once when one or more of the one or more layers have been included in more than one of the plurality of OLSs.

7. The method of any of claims 1 to 6, further comprising inferring a second DPB size from a first DPB size included in the set of DPB parameters.
8. The method of any of claims 1 to 7, wherein one of the one or more layers from the plurality of layers comprises one or more sublayers.
9. The method of any of claims 1 to 8, further comprising displaying the decoded picture on a display of an electronic device.
10. A method of encoding implemented by a video encoder, the method comprising:
 - generating, by the video encoder, a plurality of layers, a video parameter set (VPS) specifying a plurality of output layer sets (OLSs) each including one or more layers from the plurality of layers, and a sequence parameter set (SPS) including a set of decoded picture buffer (DPB) parameters for each of the one or more layers only once when one or more of the one or more layers have been included in more than one of the plurality of OLSs;
 - encoding, by the video encoder, the plurality of layers, the VPS, and the SPS into a video bitstream; and
 - storing, by the video encoder, the video bitstream for communication toward a video decoder.
11. The method of claim 10, further comprising designating one of the one or more layers as an output layer and designating another of the one or more layers as a non-output layer.
12. The method of any of claims 10 to 11, , and wherein the SPS includes level information for each of the one or more layers only once when one or more of the one or more layers have been included in more than one of the plurality of OLSs.
13. The method of any of claims 10 to 12, wherein the set of DPB parameters includes a single DPB size.

14. The method of any of claims 10 to 13, wherein one of the one or more layers from the plurality of layers comprises one or more sublayers.
15. A decoding device, comprising:
a receiver configured to receive a video bitstream including a plurality of layers, a video parameter set (VPS) specifying a plurality of output layer sets (OLSs) each including one or more layers from the plurality of layers, and a sequence parameter set (SPS) including a set of decoded picture buffer (DPB) parameters for each of the one or more layers only once when one or more of the one or more layers have been included in more than one of the plurality of OLSs;
a memory coupled to the receiver, the memory storing instructions; and
a processor coupled to the memory, the processor configured to execute the instructions to cause the decoding device to decode a picture from one of the plurality of layers to obtain a decoded picture.
16. The decoding device of claim 15, wherein the processor is further configured to:
select an output layer from one of the one or more layers prior to the decoding; and
select the picture from the output layer after the output layer has been selected.
17. The decoding device of any of claims 15 to 16, wherein the set of DPB parameters includes a first DPB size and a second DPB size.
18. The decoding device of any of claims 15 to 17, wherein the first DPB size corresponds to an output layer from the one or more layers and the second DPB size corresponds to a non-output layer from the one or more layers.
19. The decoding device of claim 18, wherein the set of DPB parameters includes a single DPB size when an output layer from the one or more layers and a non-output layer from the one or more layers both have the single DPB size.

20. The decoding device of any of claims 15 to 19, wherein the processor is further configured to infer a second DPB size from a first DPB size included in the set of DPB parameters.
21. The decoding device of any of claims 15 to 20, wherein one of the one or more layers from the plurality of layers comprises one or more sublayers.
22. The decoding device of any of claims 15 to 21, further comprising a display configured to display the decoded picture.
23. An encoding device, comprising:
a memory containing instructions;
a processor coupled to the memory, the processor configured to implement the instructions to cause the encoding device to:
generate a plurality of layers, a video parameter set (VPS) specifying a plurality of output layer sets (OLSs) each including one or more layers from the plurality of layers, and a sequence parameter set (SPS) including a set of decoded picture buffer (DPB) parameters for each of the one or more layers only once when one or more of the one or more layers have been included in more than one of the plurality of OLSs;
encode the plurality of layers, the VPS, and the SPS into a video bitstream; and
a transmitter coupled to the processor, the transmitter configured to transmit the video bitstream toward a video decoder.
24. The encoding device of claim 23, wherein the processor is further configured to cause the encoding device to designate one of the one or more layers as an output layer and designate another of the one or more layers as a non-output layer.
25. The encoding device of any of claims 23 to 24, wherein the set of DPB parameters includes a first DPB size and a second DPB size.

26. The encoding device of any of claims 23 to 25, wherein the set of DPB parameters includes a single DPB size.
27. The encoding device of any of claims 23 to 26, wherein one of the one or more layers from the plurality of layers comprises one or more sublayers.
28. A coding apparatus, comprising:
a receiver configured to receive a picture to encode or to receive a bitstream to decode;
a transmitter coupled to the receiver, the transmitter configured to transmit the bitstream to a decoder or to transmit a decoded image to a display;
a memory coupled to at least one of the receiver or the transmitter, the memory configured to store instructions; and
a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to perform the method in any of claims 1 to 9 and any of claims 10 to 14.
29. The coding apparatus of claim 28, further comprising a display configured to display a decoded picture.
30. A system, comprising:
an encoder; and
a decoder in communication with the encoder, wherein the encoder or the decoder includes the decoding device, the encoding device, or the coding apparatus of any of claims 15 to 29.
31. A means for coding, comprising:
receiving means configured to receive a picture to encode or to receive a bitstream to decode;
transmission means coupled to the receiving means, the transmission means configured to transmit the bitstream to a decoding means or to transmit a decoded image to a display means;
storage means coupled to at least one of the receiving means or the transmission means, the storage means configured to store instructions; and

processing means coupled to the storage means, the processing means configured to execute the instructions stored in the storage means to perform the method in any of claims 1 to 9 and any of claims 10 to 14.